

Notice of Allowability

Application No.

10/640,984

Applicant(s)

SRINIVASAN ET AL.

Examiner

ALEX NOGUEROLA

Art Unit

1753

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address--

All claims being allowable, PROSECUTION ON THE MERITS IS (OR REMAINS) CLOSED in this application. If not included herewith (or previously mailed), a Notice of Allowance (PTOL-85) or other appropriate communication will be mailed in due course. **THIS NOTICE OF ALLOWABILITY IS NOT A GRANT OF PATENT RIGHTS.** This application is subject to withdrawal from issue at the initiative of the Office or upon petition by the applicant. See 37 CFR 1.313 and MPEP 1308.

1. ☐ This communication is responsive to ____.
2. ☒ The allowed claim(s) is/are 1-33.
3. ☒ The drawings filed on 14 August 2003 are accepted by the Examiner.
4. ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some* c) ☐ None of the:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. ____.
3. ☐ Copies of the certified copies of the priority documents have been received in this national stage application from the International Bureau (PCT Rule 17.2(a)).
- * Certified copies not received: ____.

Applicant has THREE MONTHS FROM THE "MAILING DATE" of this communication to file a reply complying with the requirements noted below. Failure to timely comply will result in ABANDONMENT of this application.

THIS THREE-MONTH PERIOD IS NOT EXTENDABLE.

5. ☐ A SUBSTITUTE OATH OR DECLARATION must be submitted. Note the attached EXAMINER'S AMENDMENT or NOTICE OF INFORMAL PATENT APPLICATION (PTO-152) which gives reason(s) why the oath or declaration is deficient.
6. ☐ CORRECTED DRAWINGS (as "replacement sheets") must be submitted.
- (a) ☐ including changes required by the Notice of Draftsperson's Patent Drawing Review (PTO-948) attached
- 1) ☐ hereto or 2) ☐ to Paper No./Mail Date ____.
- (b) ☐ including changes required by the attached Examiner's Amendment / Comment or in the Office action of Paper No./Mail Date ____.
- Identifying indicia such as the application number (see 37 CFR 1.84(c)) should be written on the drawings in the front (not the back) of each sheet. Replacement sheet(s) should be labeled as such in the header according to 37 CFR 1.121(d).
7. ☐ DEPOSIT OF and/or INFORMATION about the deposit of BIOLOGICAL MATERIAL must be submitted. Note the attached Examiner's comment regarding REQUIREMENT FOR THE DEPOSIT OF BIOLOGICAL MATERIAL.

Attachment(s)

1. ☒ Notice of References Cited (PTO-892)
2. ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3. ☒ Information Disclosure Statements (PTO-1449 or PTO/SB/08),
Paper No./Mail Date 02/25/2004
4. ☐ Examiner's Comment Regarding Requirement for Deposit
of Biological Material
5. ☐ Notice of Informal Patent Application (PTO-152)
6. ☐ Interview Summary (PTO-413),
Paper No./Mail Date ____.
7. ☐ Examiner's Amendment/Comment
8. ☒ Examiner's Statement of Reasons for Allowance
9. ☐ Other ____.

Alex Noguerola
Primary Examiner
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DETAILED ACTION

Allowable Subject Matter

1. Claims 1-33 are allowed.
2. The following is an examiner's statement of reasons for allowance:
 - a) Claim 1 is nonobvious because it requires treating the substrate using cyclic voltammetry to provide a fractal dimension of greater than about 2 before contacting the substrate with dithiol molecules.

Black et al. ("Synthesis of a Rigid Dimethoxynaphthalene-Spacer-Dithiol Which Spontaneously attaches to Au and Pt Electrodes: Properties of Monolayer Films in NonAqueous Solvents," *J. Am. Chem. Soc.* 1993, 115, 7924-7925) bind dithiol molecules to the electrode substrate before performing cyclic voltammetry (second full paragraph in the second column on page 7924). It would not have been obvious to perform cyclic voltammetry before contacting the substrate with the dithiol molecules because the dithiol molecules spontaneously bind to the electrode substrate (title) and Black et al. only perform cyclic voltammetry to characterize the electrode (Figure 1), not to provide a fractal dimension greater than about 2 to the substrate. Black et al. also do not disclose

using their electrode for accumulating an analyte from a target sample or detecting an analyte.

Maskus et al. ("Synthesis and Characterization of Redox-Active Metal Complexes Sequentially Self-assembled onto Gold Electrodes via a New Thiol-Terpyridine Ligand," *Langmuir* 1996, 12, 4455-4462) perform cyclic voltammetry to clean the electrode substrate, not to provide a fractal dimension greater than about 2 to the substrate (Procedures on page 4456). In fact, Maskus et al. teach away from providing a fractal dimension greater than about 2 to the substrate because they polish the electrode to achieve a very smooth substrate surface (Scheme 1 and Procedures on page 4456). Also, Markus et al. only disclose binding thiol-terpyridine to the electrode substrate not a dithiol molecule, and do not disclose using their electrode for accumulating an analyte from a target sample or detecting an analyte (Markus et al. mention electrocatalysis and nonlinear optics in the Conclusions on page 4462).

Porter et al. (US 5,827,417) apply a cleaning voltage and then a depositing voltage to the electrode substrate (col. 6, ln. 54 – col. 7, ln. 17). The depositing voltage is applied throughout the depositing step, while the thiolate coating is formed. Neither the cleaning voltage nor the depositing voltage is disclosed as providing a fractal dimension greater than about 2 to the substrate. Since the cleaning voltage is for completely removing impurities from the substrate surface (col. 6, ln. 65 – col. 7, ln. 6) one with ordinary skill in the art would expect it to smoothen the surface of the electrode substrate. Also, the cleaning voltage and the depositing voltages are fixed voltages (col. 6, ln. 65 – col. 7, ln. 10). Cyclic voltammetry is only performed as a preliminary step to calculate

the level of coverage of the thiolate monolayer on the electrode substrate for a particular voltage and it is performed while the thiol molecules are contacted with the substrate, as is the cleaning step (col. 6, ln. 54 – col. 7, ln. 10). During cyclic voltammetry thiolate is deposited and then removed (col. 7, ll. 28-53), so an electrode having thiol group attached thereto and capable of binding an analyte is not produced by cyclic voltammetry. A constant voltage is used when the thiolate is actually deposited to produce an analysis electrode (col. 7, ll. 42-53 and claim 1).

b) Claims 2-33 depend directly or indirectly from allowable claim 1.

3. Any comments considered necessary by applicant must be submitted no later than the payment of the issue fee and, to avoid processing delays, should preferably accompany the issue fee. Such submissions should be clearly labeled “Comments on Statement of Reasons for Allowance.”

4. Any inquiry concerning this communication or earlier communications from the examiner should be directed to ALEX NOGUEROLA whose telephone number is (571) 272-1343. The examiner can normally be reached on M-F 8:30 - 5:00.

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If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, NAM NGUYEN can be reached on (571) 272-1342. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).



Alex Noguerola

Primary Examiner

AU 1753

July 12, 2004